

**CLAIMS:**

1. A method of supplying steam and a hydrogen feedstock to a primary process for producing synthesis gas, the method including

5 in a reformer of a secondary process, which reformer comprises a plurality of catalyst containing reforming passages, combusting a fuel to provide heat and a hot combustion gas and using the heat to heat all of the reforming passages, whilst producing a hot synthesis gas by catalytically endothermically reforming a hydrocarbonaceous gas in the presence of process steam in some of the catalyst  
10 containing reforming passages only;

cooling the hot synthesis gas by heat exchange with water to produce steam and to provide cooled synthesis gas;

supplying said steam to the primary process for producing synthesis gas;

15 treating at least a portion of the cooled synthesis gas to produce a hydrogen feedstock;

supplying said hydrogen feedstock to the primary process for producing synthesis gas;

20 cooling the reforming passages not producing hot synthesis gas by passing a cooling or heat transfer medium through said reforming passages not producing hot synthesis gas; and

separating the hot synthesis gas exiting some of the reforming passages from the cooling or heat transfer medium exiting other reforming passages so that the hot synthesis gas and the cooling or heat transfer medium do not mix.

25 2. The method as claimed in claim 1, in which the cooling or heat transfer medium is steam generated in the secondary process.

30 3. The method as claimed in claim 2, which includes drying or superheating the steam prior to passing the steam through some of the reforming passages as cooling or heat transfer medium.

4. The method as claimed in claim 3, in which the steam is dried or superheated in indirect heat exchange relationship with hot combustion gas from the reformer of the secondary process.

5. The method as claimed in any one of claims 2 to 4 inclusive, which includes feeding a hydrocarbonaceous gas and process steam into the reformer to pass together through some of the reforming passages only, the process steam being steam generated in the secondary process and being the same steam from which the steam  
5 for use as cooling or heat transfer medium is obtained.
6. The method as claimed in any one of the preceding claims, in which the hot synthesis gas exiting the reformer of the secondary process is cooled by heat exchange in a waste heat boiler supplied with boiler feed water, the method further including  
10 heating the boiler feed water in indirect heat exchange relationship with the hot combustion gas from the reformer of the secondary process, before feeding the boiler feed water into the waste heat boiler.
7. The method as claimed in any one of the preceding claims, which includes  
15 increasing steam production by transferring heat from the cooling or heat transfer medium to water and allowing the water to flash to produce steam.
8. The method as claimed in any one of the preceding claims, which includes switching some reforming passages from receiving steam and a hydrocarbonaceous  
20 gas, to receiving the cooling or heat transfer medium only, so that some of the reforming passages are used to catalytically endothermically reform the hydrocarbonaceous gas and some reforming passages are only cooled by the cooling or heat transfer medium and thus do not produce any synthesis gas.
- 25 9. The method as claimed in any one of the preceding claims, which includes switching some reforming passages from receiving a cooling or heat transfer medium only, to receiving steam and a hydrocarbonaceous gas, thus increasing the production of synthesis gas and decreasing the production of steam in the secondary process.
- 30 10. The method as claimed in any one of the preceding claims, in which the primary process includes a Fischer-Tropsch hydrocarbon synthesis process to synthesise higher hydrocarbons from the synthesis gas produced by the primary process.

11. A method of starting a hydrocarbonaceous gas conversion plant which has start-up hydrogen and steam requirements, the method including

heating a reformer, comprising a plurality of catalyst containing reforming passages passing through a heating zone by combusting a fuel, thereby also producing  
5 a hot combustion gas;

generating steam by transferring heat generated by the combustion of the fuel to water in a steam generation circuit;

producing hot synthesis gas from some of the reforming passages only by feeding a hydrocarbonaceous gas and at least some of the generated steam into said reforming  
10 passages;

generating more steam by transferring heat from the hot synthesis gas to the water in the steam generation circuit;

supplying at least a portion of the steam to the hydrocarbonaceous gas conversion plant to satisfy the start-up steam requirements of the hydrocarbonaceous gas  
15 conversion plant;

treating at least a portion of the synthesis gas to produce a hydrogen feedstock; and

supplying at least a portion of said hydrogen feedstock to the hydrocarbonaceous gas conversion plant to satisfy the start-up hydrogen requirements of the  
20 hydrocarbonaceous gas conversion plant.

12. The method as claimed in claim 11, which includes increasing the synthesis gas production and hence the hydrogen feedstock production by using more reforming passages for synthesis gas production as the hydrocarbonaceous gas conversion plant  
25 comes online.

13. The method as claimed in claim 11 or claim 12, which includes initially generating maximum steam by using reforming passages not used for synthesis gas generation, to transfer heat from the heating zone into the steam generation circuit, by  
30 passing a heat transfer medium through the reforming passages thereby heating the heat transfer medium and transferring heat from the heated transfer medium to the water in the steam generation circuit to produce more steam.

14. The method as claimed in claim 13, in which steam is fed to the reforming passages as heat transfer medium, the method including drying or superheating the steam in indirect heat exchange relationship with hot combustion gas exiting the heating zone of the reformer before feeding the steam to the reforming passages.

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15. An installation for producing steam and synthesis gas, the installation including

a reformer which includes a plurality of catalyst containing reforming passages passing through a heating zone, the reforming passages having inlets grouped into at least two groups and outlets grouped into at least two groups;

a feed arrangement having a first condition in which a hydrocarbonaceous gas and steam can be fed into one group of inlets and a cooling or heat transfer medium only can be fed into another group of inlets, and a second condition in which a hydrocarbonaceous gas and steam can be fed into both of the groups of inlets;

15 a discharge arrangement having a first condition in which synthesis gas can be removed from the group of outlets of the reforming passages fed with the hydrocarbonaceous gas and steam and in which the cooling or heat transfer medium can be removed from the reforming passages fed with the cooling or heat transfer medium only, without mixing the synthesis gas and the cooling or heat transfer medium, 20 and a second condition in which synthesis gas can be removed from both groups of outlets; and

a waste heat boiler to generate steam by means of heat exchange between the synthesis gas produced and boiler water.

25 16. The installation as claimed in claim 15, in which the heating zone is defined by a fire box of the reformer.

17. The installation as claimed in claim 15 or claim 16, in which the heating zone includes heat exchange surfaces to allow heating of boiler water to increase steam 30 production.

18. The installation as claimed in any one of claims 15 to 17 inclusive, which includes a heat exchanger to exchange heat between hot combustion gas from the

heating zone and boiler feed water fed to the waste heat boiler and/or steam produced by the waste heat boiler.

19. The installation as claimed in claim 18, in which the discharge arrangement is  
5 configured to pass the cooling or heat transfer medium to the waste heat boiler for  
indirect heat exchange with boiler water in the waste heat boiler, thereby cooling the  
cooling or heat transfer medium.

20. The installation as claimed in any one of claims 15 to 19 inclusive, which  
10 includes a hydrogen generating unit to produce a hydrogen or hydrogen enriched  
stream from at least a portion of the synthesis gas.